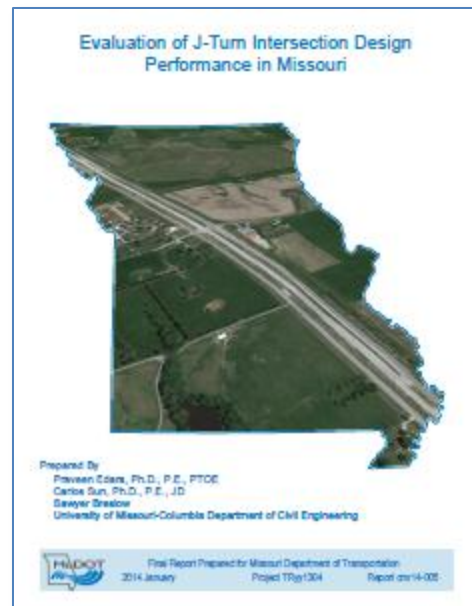


# Research Summary

## Evaluation of Effectiveness of Alternate Geometric Designs in Missouri: J-Turns and Other Novel Designs

A large percentage of crashes that take place on high-speed rural expressways occur at intersections with minor roads. Right-angle collisions are generally considered one of the most severe collision types. J-turns (also known as a restricted crossing U-Turn or RCUT and Superstreet intersection) are a low-cost alternative design for improving the safety of at-grade intersections on expressways. These intersections provide a safer merge operation instead of a crossing action. This reduces both right angle collisions and collisions in general. There are tradeoffs to this design including increased travel time, potential for driver confusion due to the unique design, various design considerations may be required due to site geometric issues, and potential negative public perception.

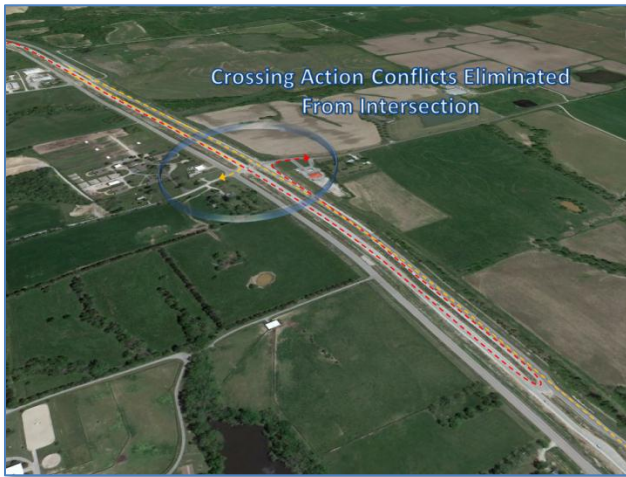
This project used field studies, traffic conflict analysis, crash analysis, and a public survey to evaluate J-turn installations in Missouri, comparing them to traditional two-way stop controlled intersections. The results of this study proved the safety benefits of the J-turn in



decreased frequencies of crashes, especially disabling injury and fatal crashes; and in significantly increased average time-to-collision (considered a positive result). Although the travel time was increased by approximately one minute at these locations, the public perception of J-turns was mixed. Concerns raised by the public included driver confusion, difficulty merging with insufficient acceleration and deceleration lanes, and insufficient U-turn radius.

The results of this study provide justification for this low cost safety improvement and a better understanding of driver needs and expectations which will help ensure that future installations are as accommodating as possible. Since J-turn installations are very cost effective and are so successful at increasing driver safety, this project will allow the proper usage of limited construction funds to make Missouri roads safer while maintaining public satisfaction.





Google Maps view of J-turns on US63N between Jefferson City and Columbia, MO

*The J-turn intersection design **reduces** the number and severity of vehicle collisions.*

- 34.8% reduction in crash frequency for all crashes
- 53.7% reduction in crash frequency for all injury and fatal crashes
- 86% decrease in annual disabling injury crashes
- 50% decrease in minor injury crashes

***None** of the five sites exhibited a fatal crash following J-turn implementation.*

## ***Project Information***

**PROJECT NAME:** Evaluation of Effectiveness of Alternate Geometric Designs in Missouri: J-Turns and Other Novel Designs

**PROJECT START/END DATE:** July 16, 2012-December 31, 2013

**PROJECT COST:** \$27,635

**LEAD CONTRACTOR:** University of Missouri-Columbia

**PRINCIPAL INVESTIGATOR:** Dr. Praveen Edara

**REPORT NAME:** *Evaluation of J-turn Intersection Design Performance in Missouri*

**REPORT NUMBER:** [cmr 14-005](#)

**REPORT DATE:** January 2014

## ***Project Manager***

**ANDREW HANKS, P.E.**

Senior Research Analyst  
Missouri Dept. of Transportation  
Construction & Materials  
Research Section  
1617 Missouri Blvd.  
Jefferson City, MO 65109  
Ph. (573) 526-4325  
Email [andrew.hanks@modot.mo.gov](mailto:andrew.hanks@modot.mo.gov)

